

# Report from the Higgs performance WG 12/17/24

Angela Taliercio, Birgit Stapf, Sarah Williams

# Status and news

- FCC workshop on 13th to 17th January: <https://indico.cern.ch/event/1439509/>
- We will have a contribution on the FCC-hh effort, please send us the material you want to include in the presentation within the first week of January:
  - Planning a rehearsal of the talk the 9th of January (first meeting of next year)

# 3rd meeting agenda

- 16:00** → 16:05

**News**

**Speakers:** Angela Taliencio (Northwestern University (US)), Birgit Stapf (CERN), Sarah Louise Williams (University of Cambridge (GB))

🕒 5m

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- 16:05** → 16:25

**Update on the bbt analysis** ¶

**Speaker:** Cristiano Sebastiani (CERN)

Liverpool\_FCC\_bbt...

🕒 20m

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- 16:25** → 16:45

**Improving the trilinear Higgs boson self-coupling measurement at the FCC-hh [by exploiting triangle vs. box kinematics]**

**Speaker:** Bastien Voirin (Centre National de la Recherche Scientifique (FR))

FCC-hh\_2024-12-12...

🕒 20m

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- 16:45** → 17:05

**Round-table**

Discussion from ongoing studies

  - Plans from Oxford

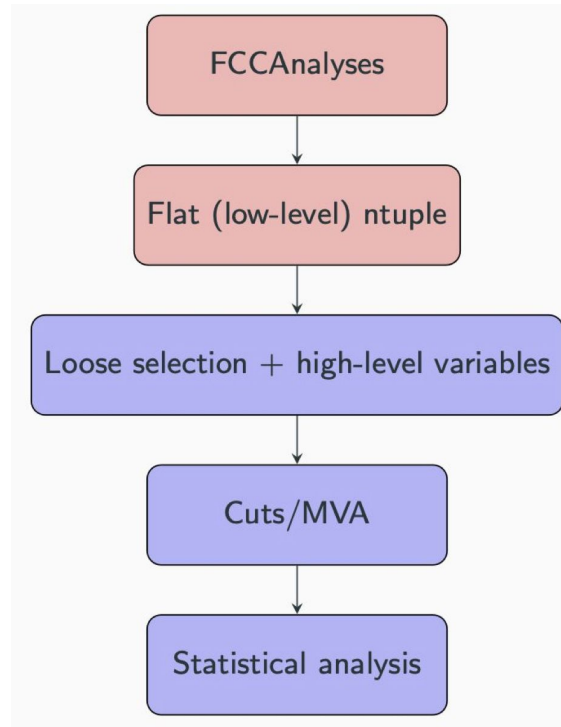
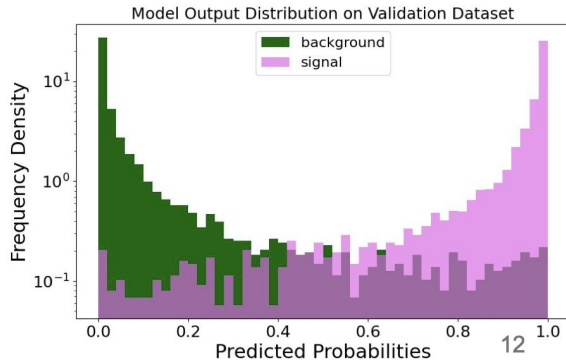
**Speaker:** James Frost (University of Oxford (GB))

🕒 20m

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# Update on the bbt analysis

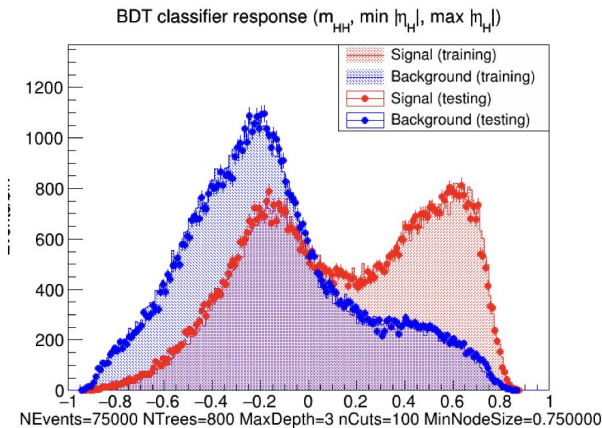
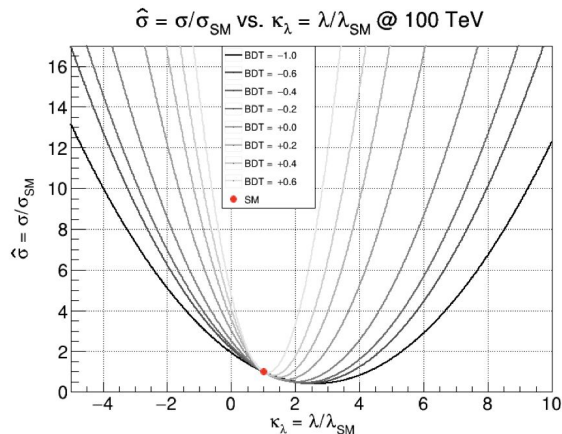
- Interest on bbt:
  - Use more modern MVA tools to improve S/B:
    - GNN and GraphTransformers
  - Use latest FCC-hh simulated samples with more complete background estimation
- Aim for including bbt in the combination





# Improving the trilinear Higgs boson self-coupling

- Improving the trilinear Higgs boson self-coupling:
  - If we are able to separate the box from the triangle contribution we could gain sensitivity in the SM measurement
  - Main idea is to include this in the existing bbgg analysis
  - We are working on this



# Roundtable

- Update on the LHE production: [link](#)
- Interest for HHH study: [link](#)

# Status of other ongoing studies

- Single Higgs measurements in  $H(\mu\mu)$  to  $H(ZZ\rightarrow 4\mu)$  ratio redone at alternative center of mass energy scenarios (CERN): Reproducing results at 100 TeV
- New: Single Higgs measurements in  $ttH(\gamma\gamma)$  (CERN, DESY): Producing fast sim samples
- New: Higgs width measurement from off-shell production in VBF  $H(WW)$  (Nikhef): Iterating sample generation